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March 21, 2005

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APPLICATION NUMBER: 10/790,537

FILING DATE: *March 01, 2004*

RELATED PCT APPLICATION NUMBER: *PCT/US05/06734*



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<div>15866 U.S. PTO</div> <div>UTILITY PATENT APPLICATION TRANSMITTAL</div> <div>(Only for new nonprovisional applications under 37 CFR 1.53(b))</div>		Attorney Docket No.	HE0221	
		First Named Inventor:	James G. Renfro, Jr. et al.	
		Title:	FIBER OPTIC SPLICE COMPONENT	
		Express Mail Label No.	Express Mail No: EV333680919US	
APPLICATION ELEMENTS See MPEP chapter 600 concerning utility patent application contents.		Mail Stop Patent Application Commissioner for Patents PO Box 1450 Alexandria, VA 22313-1450		
1. <input checked="" type="checkbox"/> Fee Transmittal Form (e.g., PTO/SB/17) (Submit an original and a duplicate for fee processing)		7. <input type="checkbox"/> CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix)		
2. <input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27.				
3. <input checked="" type="checkbox"/> Specification [Total Pages: 16] (preferred arrangement set forth below) <ul style="list-style-type: none">- Descriptive title of the invention- Cross References to Related Applications- Statement Regarding Fed sponsored R&D- Reference to sequence listing, a table, or a computer program listing appendix- Background of the Invention- Brief Summary of the Invention- Brief Description of the Drawings (if filed)- Detailed Description- Claim(s)- Abstract of the Disclosure		8. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary) <ul style="list-style-type: none">a. <input type="checkbox"/> Computer Readable Form (CRF)b. <input type="checkbox"/> Specification Sequence Listing on:<ul style="list-style-type: none">i. <input type="checkbox"/> CD-ROM or CD-R (2 copies); orii. <input type="checkbox"/> paperc. <input type="checkbox"/> Statement verifying identity of above copies		
4. <input checked="" type="checkbox"/> Drawing(s) (35 U.S.C. 113) [Total Sheets: 6]		<div>ACCOMPANYING APPLICATION PARTS</div> <div>9. <input checked="" type="checkbox"/> Assignment Papers (cover sheet & document(s))</div> <div>10. <input type="checkbox"/> 37 CFR 3.73(b) Statement (when there is an assignee) <input checked="" type="checkbox"/> Power of Attorney</div> <div>11. <input type="checkbox"/> English Translation Document (if applicable)</div> <div>12. <input checked="" type="checkbox"/> Information Disclosure Statement (IDS)/PTO-1449 <input checked="" type="checkbox"/> Copies of IDS Citations</div> <div>13. <input type="checkbox"/> Preliminary Amendment</div> <div>14. <input checked="" type="checkbox"/> Return Receipt Postcard (MPEP 503) (should be specifically itemized)</div> <div>15. <input type="checkbox"/> Certified Copy of Priority Document(s) (if foreign priority is claimed)</div> <div>16. <input type="checkbox"/> Nonpublication Request under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent.</div> <div>17. <input type="checkbox"/> Other:</div>		
5. Oath or Declaration [Total Pages: 2] <ul style="list-style-type: none">a. <input checked="" type="checkbox"/> Newly executed (original or copy)b. <input type="checkbox"/> Copy from a prior application (37 CFR 1.63(d)) (for continuation/divisional with Box 18 completed)<ul style="list-style-type: none">i. <input type="checkbox"/> <u>DELETION OF INVENTOR(S)</u> Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).				
6. <input type="checkbox"/> Application Data Sheet. See 37 CFR 1.76				
18. If a CONTINUING APPLICATION, check appropriate box and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76: <input type="checkbox"/> Continuation <input type="checkbox"/> Divisional <input type="checkbox"/> Continuation-in-part (CIP) of prior application No: / Prior application information: Examiner: Group/Art Unit:				
For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.				
19. CORRESPONDENCE ADDRESS				
<div>21495</div> <div>PATENT TRADEMARK OFFICE</div>				
Name (Print/Type)		Registration No. (Attorney/Agent)		36,504
Signature		Date		March 1, 2004

FEE TRANSMITTAL

for FY 2003

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT

\$856.00

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ Other ☐ None
☒ Deposit Account
 Deposit Account No. **19-2167**

 Deposit Account Name **Corning Cable Systems LLC**

The Director is authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☒ Credit any overpayments

☐ Charge any additional fee(s) during the pendency of this application

☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account

FEE CALCULATION

1. BASIC FILING FEE

Large Fee Code	Entity Fee (\$)	Small Fee Code	Entity Fee (\$)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	770.00
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	
SUBTOTAL (1):					\$770.00

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims	20	-	20**	= 0	X 18.00	= 0.00
Independent Claims	4	-	3**	= 1	X 86.00	= 86.00
Multiple Dependent						=

Large Fee Code	Entity Fee (\$)	Small Fee Code	Entity Fee (\$)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	**Reissue independent claims over original patent
1205	18	2205	9	**Reissue claims in excess of 20 and over original patent

**or number previously paid, if greater; For Reissues, see above

SUBTOTAL (2): \$86.00

Complete if Known

Application Number	
Filing Date	
First Named Inventor	James G. Renfro, Jr. et al.
Examiner Name	
Art Unit	
Attorney Docket No.	HE0221

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for ex parte reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fees under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Info Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify):

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3):

SUBMITTED BY:

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Registration No. (Attorney/Agent)

36,504

Complete (if applicable)

Telephone:

(828) 901-5904

Signature



Date

3/1/04

PATENT

FIBER OPTIC SPLICE COMPONENT

FIELD OF THE INVENTION

[001] The present invention relates to a fiber optic splice component and method for fusing optical fibers in the fiber optic splice component. More particularly, the invention is a fiber optic splice component that allows splicing of the optical fibers and sealing of the splice in a single component or a single machine.

BACKGROUND OF THE INVENTION

[002] There are prior art fiber optic splice components and methods for fusion splicing optical fibers and sealing a fiber optic splice. However, the components and methods do not allow for splicing and sealing the splice in a single fiber optic splice component or with a single machine.

[003] Accordingly, the present invention is directed to a fiber optic splice component and machine that substantially obviates one or more of the problems and disadvantages in the prior art. Additional features and advantages of the invention will be set forth in the description that follows, and in part will be apparent from the description, or may be learned by practice of the invention. These objectives and other advantages of the invention will be realized and attained by the fiber optic splice component, machine and method particularly pointed out in the written description and accompanying drawings, as well as the appended claims.

SUMMARY OF THE INVENTION

[004] To achieve these and other advantages and in accordance with the purpose of the invention as embodied and broadly described herein, the invention is directed to a fiber optic splice component that includes a ferrule having a passageway extending from a first end to a second end thereof to hold an optical fiber inserted from each end and having an opening between the first and second ends in communication with the passageway, a housing, the housing configured to hold the ferrule therein, and at least one electrode disposed in the housing and adjacent to the opening in the ferrule for fusion splicing the optical fibers.

[005] In another aspect, the invention provides a ferrule to be used in a fiber optic splice component that includes a body having a first end and a second end, the body having a lead-in portion at the first end and at the second end, a passageway extending from the first end to the second end of the body to hold an optical fiber inserted from each end, and an opening disposed between the first and second ends in communication with the passageway to be used in splicing the optical fibers.

[006] In yet another aspect, the invention provides a method for splicing two optical fibers in a fiber optic splice component that includes the steps of providing the fiber optic splice component, the fiber optic splice component comprising a ferrule having a passageway extending from a first end to a second end to hold an optical fiber inserted from each end and having an opening between the first and second ends in communication with the passageway, a housing, and at least one electrode disposed in the housing adjacent to the opening in the ferrule for fusion splicing the optical fibers, inserting the optical fibers into respective ends of the fiber optic splice component, initiating a fiber optic splice machine, the splice machine

applying a voltage to the electrodes to cause an arc to be generated across the opening of the ferrule thereby fusing the optical fibers, and heating a splice protective element disposed in the housing to melt and form around the fused optical fibers.

[007] In another aspect, the invention provides a fiber optic splice machine that includes a base portion, the base portion including a fiber optic splice holder for holding at least a portion of a fiber optic splice component, electrical contacts adjacent the fiber optic splice holder and in communication with an arc generator, a heating element disposed under the fiber optic splice holder, and a top portion hingedly connected to the base portion and configured to hold a top portion of the fiber optic splice component.

[008] It is to be understood that the foregoing general description and the following detailed description are merely exemplary and explanatory and are included for the purpose of providing further understanding of the invention as claimed.

[009] The accompanying drawings are likewise included to provide a further understanding of the invention and are incorporated in and constitute a part of the specification. The drawings illustrate several embodiments of the invention and together with the written descriptions serve to explain the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[010] FIG. 1 is an exploded view of an exemplary embodiment of a fiber optic splice component according to the present invention;

[011] FIG. 2 is a lateral cross section view of the fiber optic splice component of FIG. 1;

[012] FIG. 3a is a schematic illustration of opposed optical fibers being inserted into the fiber optic splice component of FIG. 1;

[013] FIG. 3b is a schematic illustration of the opposed optical fibers in the area of splicing in the fiber optic splice component of FIG. 1;

[014] FIG. 3c is a schematic illustration of the opposed optical fibers being spliced in the fiber optic splice component of FIG. 1;

[015] FIG. 3d is a schematic illustration showing a splice protection element aligned with the spliced optical fibers;

[016] FIG. 3e is a schematic illustration of the fiber optic splice component after the splicing and sealing operations are performed;

[017] FIG. 4 is an exemplary embodiment of a machine used to splice and protect a fiber optic splice in a fiber optic splice component according the present invention;

[018] FIG. 5 is a lateral cross section view of the machine of FIG. 4; and

[019] FIG. 6 is a partial top view of another exemplary embodiment of a machine to splice and protect a fiber optic splice in a fiber optic splice component according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[020] FIG. 1 illustrates an exemplary embodiment of a fiber optic splice component **10**.

The fiber optic splice component **10** is preferably preassembled, with the ferrule **12** already placed in the bottom portion **14a** of the housing. The bottom portion **14a** also retains the strain relief elements **16** on either end of the ferrule **12**. The fiber optic splice component **10** also has a top portion **14b** of the housing with a protection element **20** disposed therein.

[021] The housing is illustrated as having a generally cylindrical configuration. However, the housing could be of any desired configuration, including, for example, rectangular, oval,

etc. The housing preferably made from plastic, but could be made from any appropriate material, including metal. The bottom portion **14a** preferably has two electrodes **22** on either side of the ferrule **12**. The electrodes **22** may be attached to the top edge of the bottom portion **14a** or may be integral with the bottom portion **14a** and protrude inwardly through the housing. The bottom portion **14a** may also have ribs **24a** attached to an outer surface thereof to allow for corresponding structure on the top portion **14b** to assist in joining the bottom portion **14a** with the top portion **14b**. Other methods of joining the two housing portions **14a**, **14b** together would also be within the scope of the present invention. Such methods could include a hinge, projections/recesses, etc.

[022] The ferrule **12** is preferably disposed in the bottom portion **14a** prior to use. The ferrule **12** has an opening **26**, preferably near the center (from either end) of the ferrule **12**. The opening **26** allows access to a passageway **28** that extends from a first end **30** to a second end **32** of the ferrule **12**. The opening **26** is large enough to allow the electrodes **22** access to the optical fibers **34**, **36** for fusing. As can be seen in FIG. 2, the opening **26** extends slightly more than 180° around the ferrule **12** to fully expose the optical fibers **34**, **36** extending from passageway **28**. However, the opening **26** may be greater or less than 180°, depending on the locations of the electrodes **22** and the need to expose the entire circumferences of the optical fibers **34**, **36** to the electrical arc generated between the electrodes **22**. The opening **26** need only be sufficient to allow access by the electrodes **22** and the generated arc to the extent necessary to fuse the optical fibers **34**, **36**. The ferrule **12** also preferably has a lead-in portion **38** on both the first end **30** and the second end **32**. The lead-in portion is larger at the very end of the ferrule **12** and narrows to about the same diameter as the passageway **28**

through the ferrule **12**. The ferrule **12** can be made from thermoset, thermoplastic, or ceramic materials.

[023] The top portion **14b** has a protection element **20** disposed therein. The protection element **20** is typically EVA or some other heat sensitive material that provides similar melt and flow properties. The protection element **20** will be melted and will flow around the fused optical fibers in the ferrule **12** to provide further protection of the splice. The top portion **14b** may also have ribs **24b** as shown in FIG. 2 that engage the corresponding ribs **24a** on the bottom portion **14a**.

[024] The strain relief elements **16** are used to provide strain relief for the optical fibers **34**, **36**. While the strain relief elements **16** are illustrated to be frustoconical in shape, they may be of any configuration. However, the strain relief elements **16** preferably function as a lead-in for the optical fibers **34**, **36** into ferrule **12**. As illustrated best in FIGS. 3a-3e, the inside diameter of each strain relief element **16** is preferably larger at the end away from the ferrule **12** and is narrower at the end toward the ferrule **12**. While not necessary, the configuration of the strain relief elements **16** is helpful in guiding the optical fibers **34**, **36** into the lead-in portion **38** of the ferrule **12**. In fact, the strain relief elements **16** could be cylindrical with constant inner and outer diameters and still be within the scope of the present invention. The strain relief elements **16** preferably have two layers. A first layer **40** made of EVA or other heatable material to provide adhesion around the optical fibers **34**, **36** and to hold the second layer **42**. The second layer **42** is a polyolefin that provides abrasion resistance to further protect the optical fibers. The second layer **42** may also provide some moisture protection to the fiber optic splice component **10**. The two layer material for the strain relief elements **16** may be obtained from INSULTAB, Inc. of Woburn, MA.

[025] The fusion of the optical fibers in the fiber optic splice component **10** will now be described with reference to FIGS. 3a-3e. A fiber optic splice component **10** has an optical fiber **34, 36** inserted from either end. The optical fibers **34, 36** pass through the strain relief elements **16** and into the passageway **28** via the lead-in portions **38** of the ferrule **12**. Eventually, the optical fibers **34, 36** pass into the opening **26**. As illustrated in FIG. 3b, the operator may then advance the optical fibers **34, 36** until they are engaged in the opening **26**. While the ends of the optical fibers **34, 36** are illustrated to be in the center of opening **26**, they need not be located exactly at the center of the opening. However, the closer the optical fibers **34, 36** are to the center of the opening **26** (or wherever the electrodes **22** are located), the better the fusion splice will be. An arc **44**, as illustrated in FIG. 3c, is generated through the electrodes **22**, causing the optical fibers **34, 36** to be fused. After the optical fibers **34, 36** are fused together, as shown in FIG. 3d, the protection element **20** is placed over the fused optical fibers and heated. The melted protection element **20** then flows around the fused optical fibers **34, 36** and fills at least a portion of the opening **26**. At the same time the protection element **20** is being heated, the strain relief elements **16** are also being heated. Since the strain relief elements **16** are preferably made from the same material as the protection element **20**, they too will soften and form around the optical fibers **34, 36** at either end of the fiber optic splice component **10**. It should be noted that the strain relief elements **16** may be moved along the optical fibers **34, 36** to a location that is best suited for the particular application and do not have to be located where illustrated in the figures.

[026] An exemplary embodiment of a machine **50** to splice and heat the fiber optic splice component **10** is illustrated in FIGS. 4 and 5. The machine **50** has a base portion **52** and a top portion **54** preferably connected by a hinge **56**. The base portion **52** has a fiber optic

splice holder **58** located therein for receiving a fiber optic splice component, which may be the same as that disclosed above, but may also be of a different configuration. The fiber optic splice holder **58** has adjacent electrical contacts **60** to engage the electrodes **22** in the fiber optic splice component **10**. The base portion **52** also has an arc generator **62** (FIG. 5) that is in electrical communication with the electrical contacts **60** that engage the electrodes **22** to fuse the optical fibers **34, 36**.

[027] Also present in the base portion **52** is a heating element **64** (FIG. 5). The heating element **64** is preferably disposed directly under the fiber optic splice holder **58** in order to most efficiently heat the fiber optic splice component **10** and thereby melt the protection element **20** and the strain relief elements **16**. Typically the heating element **64** begins heating once the optical fibers **34, 36** have been fused. However, depending on the type of heating element used and the time required for the protection element **20** to come to temperature and the strain relief elements **16** to melt, the heating element **64** may begin heating at the same time or even before the splicing of the optical fibers **34, 36**. The sequence of splicing the optical fibers **34, 36** and heating the fiber optic splice component **10** may be initiated by the operator pressing a button or by simply closing the top portion **54** once the fiber optic splice component **10** is inserted into the machine **50**.

[028] The base portion **52** also has a battery **66** to energize the arc generator **62** and the heating element **64**. The battery **66** is preferably a rechargeable battery that can be recharged in a charger or by a 12VDC source, such as in a vehicle.

[029] The top portion **54** of the machine **50** has an opening **68** therein for receiving the top portion **14b** of the fiber optic splice component **10**. The top portion **14b** can be inserted into and held within the opening **68**, for example by a loose press fit, until an electrical arc is

generated between the electrodes **22** of the fiber optic splice component **10** and the optical fibers **34**, **36** are fused together. The top portion **14b** can then be removed from the opening **68** and secured to the bottom portion **14a**, as previously described. Alternatively, the top portion **14b** may be secured to the bottom portion **14a** when the top portion **54** of the machine **50** is rotated about the hinge **56** and closed onto the base portion **52**.

[030] FIG. 6 illustrates another exemplary embodiment of a splice machine **70**, which is similar to the prior embodiment. However, included in this embodiment of machine **70** is a clamping mechanism **72** that holds at least one of the optical fibers **34**, **36**. For example, the operator inserts the optical fiber **36** into the clamping mechanism **72**, which closes around the optical fiber **36**. The clamping mechanism **72** then moves relative to the fiber optic splice component **10** and inserts the optical fiber **36** into the opening **26** in the correct location for fusion splicing the two optical fibers **34**, **36** together. The clamping mechanism **72** may be moved by virtue of a piezo-driven mechanism in a known manner. However, the clamping mechanism may also be driven by a spring-loaded mechanism. Typically, the clamping mechanism **72** initially inserts the optical fiber **36** into the opening **26** such that a small gap remains between the optical fibers **34**, **36** so that the ends of the optical fibers may be cleaned or otherwise processed prior to fusing. The clamping mechanism **72** then operates to move the end of the optical fiber **36** into physical engagement with the end of the optical fiber **34** during the fusing process. However, the clamping mechanism **72** may also operate to insert the optical fiber **36** into the opening **26** such that the ends of the optical fibers **34**, **36** are initially in physical engagement, or are even pre-loaded. Regardless, the clamping mechanism **72** preferably biases the end of the optical fiber **36** against the end of the optical

fiber **34** as the optical fibers **34, 36** are fused together to avoid the formation of any void between the optical fibers.

[031] It will be apparent to those skilled in the art that various modifications and variations can be made in the fiber optic splice component and method for fusing optical fibers of the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

THAT WHICH IS CLAIMED IS:

1. A fiber optic splice component comprising:

a ferrule having a passageway extending from a first end to a second end thereof for receiving an optical fiber inserted from each end and having an opening between the first and second ends in communication with the passageway;

a housing, the housing configured to hold the ferrule therein; and

at least one electrode disposed in the housing and adjacent to the opening in the ferrule for fusion splicing the optical fibers.
2. The fiber optic splice component of claim 1 further comprising a protection element to seal the fusion spliced optical fibers.
3. The fiber optic splice component of claim 1 wherein the protection element is a heat shrink element.
4. The fiber optic splice component of claim 1 further comprising a strain relief element disposed in the housing.
5. The fiber optic splice component of claim 1 further comprising a lead-in portion adjacent one of the first end and the second end to guide the optical fibers into the passageway.

6. The fiber optic splice component of claim 1 further comprising a strain relief element disposed in the housing and a lead-in portion adjacent one of the first end and the second end and disposed in the strain relief element.

7. The fiber optic splice component of claim 1 further comprising a lead-in portion in the ferrule at each of the first end and the second end.

8. A ferrule adapted for use in a fiber optic splice component comprising:
a body having a first end and a second end, the body having a lead-in portion at the first end and at the second end;

a passageway extending from the first end to the second end of the body to position an optical fiber inserted from each end; and

an opening disposed between the first and second ends in communication with the passageway to splice the optical fibers together.

9. A method for splicing two optical fibers together in a fiber optic splice component comprising:

providing the fiber optic splice component, the fiber optic splice component comprising a ferrule having a passageway extending from a first end to a second end to position an optical fiber inserted from each end and having an opening between the first and second ends in communication with the passageway, a housing, and at least one electrode disposed in the housing adjacent to the opening in the ferrule for fusion splicing the optical fibers;

inserting the optical fibers into respective ends of the fiber optic splice component;
initiating a fiber optic splice machine, the splice machine:

applying a voltage to the electrodes to cause an arc to be generated across the
opening of the ferrule thereby fusing the optical fibers; and

heating a splice protection element disposed in the housing to melt and form
around the fused optical fibers.

10. The method for splicing two optical fibers in a fiber optic splice component of claim 9, wherein the applying and heating steps are initiated simultaneously.

11. The method for splicing two optical fibers in a fiber optic splice component of claim 9, wherein the applying and heating steps are initiated in series.

12. The method for splicing two optical fibers in a fiber optic splice component of claim 9, wherein the applying step is initiated before the heating step.

13. The method for splicing two optical fibers in a fiber optic splice component of claim 9, wherein only one of the applying step and the heating step are performed upon initiating the fiber optic splice machine.

14. The method for splicing two optical fibers in a fiber optic splice component of claim 9, wherein the fiber optic splice machine has a base portion and a top portion, and wherein the top portion closes on the base portion to initiate the fiber optic splice machine.

15. The method for splicing two optical fibers in a fiber optic splice component of claim 9, wherein the inserting step includes inserting the optical fibers into the opening and into physical engagement with one another.

16. The method for splicing two optical fibers in a fiber optic splice component of claim 9, wherein the inserting step includes inserting at least one optical fiber into a clamping mechanism and wherein the fiber optic splice machine further performs causing the clamping mechanism to move the at least one optical fiber into the opening for fusing the optical fibers.

17. The method for splicing two optical fibers in a fiber optic splice component of claim 16, wherein the clamping mechanism is spring driven.

18. The method for splicing two optical fibers in a fiber optic splice component of claim 16, wherein the clamping mechanism is piezo driven.

19. A fiber optic splice machine comprising:

a base portion, the base portion comprising:

a fiber optic splice holder for holding a portion of a fiber optic splice

component;

electrical contacts adjacent the fiber optic splice holder and in communication

with an arc generator; and

a heating element disposed under the fiber optic splice holder; and
a top portion for covering the base portion and configured to hold a top portion of the fiber optic splice component.

20. The fiber optic splice machine of claim 19, further comprising a battery to energize the arc generator and the heating element.

FIBER OPTIC SPLICE COMPONENT

ABSTRACT OF THE DISCLOSURE

[032] A fiber optic splice component is provided with a ferrule having an opening therein, a housing to hold the ferrule, and at least one electrode in the housing for fusing optical fibers inserted into the opening. A method and machine to fuse optical fibers in a fiber optic splice component is also provided, with the method and machine being capable of melting a protection element around the fused optical fibers. A splicing ferrule with a lead-in portion at each end of the ferrule is also provided.

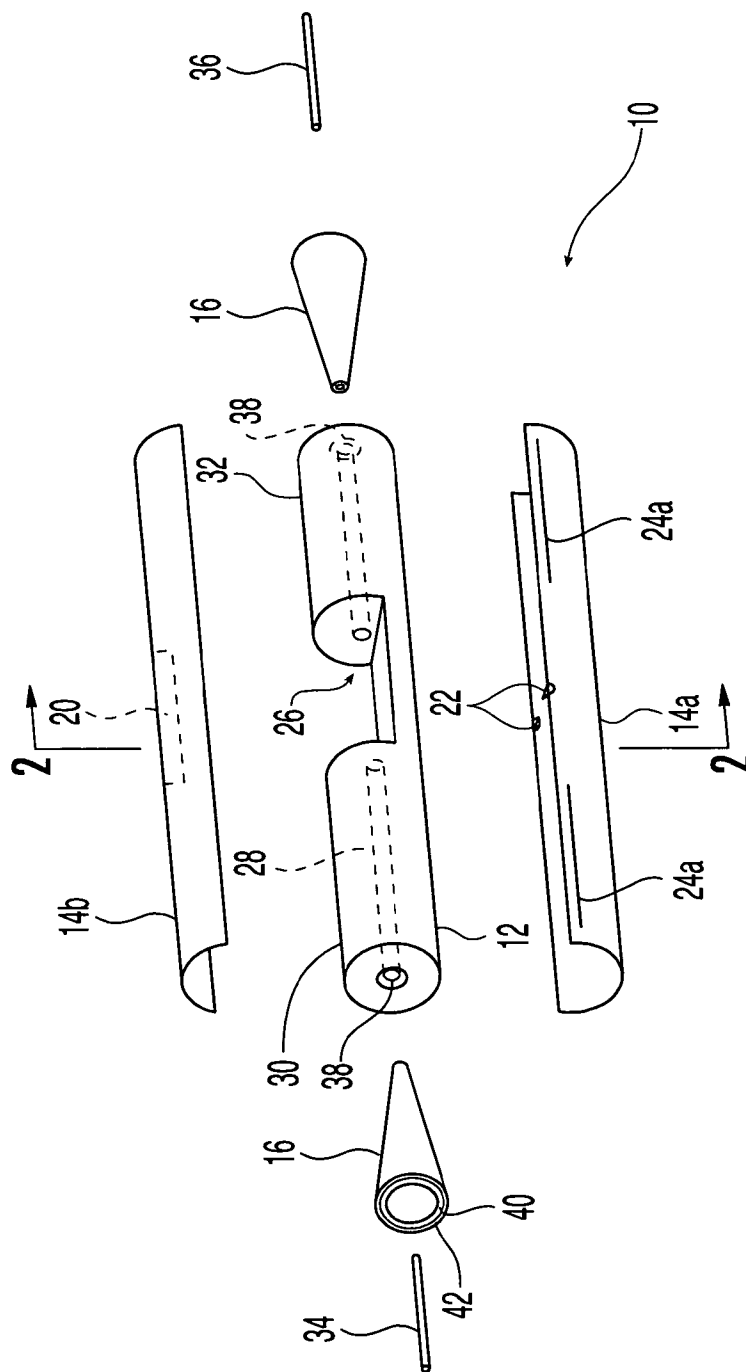


Fig. 1

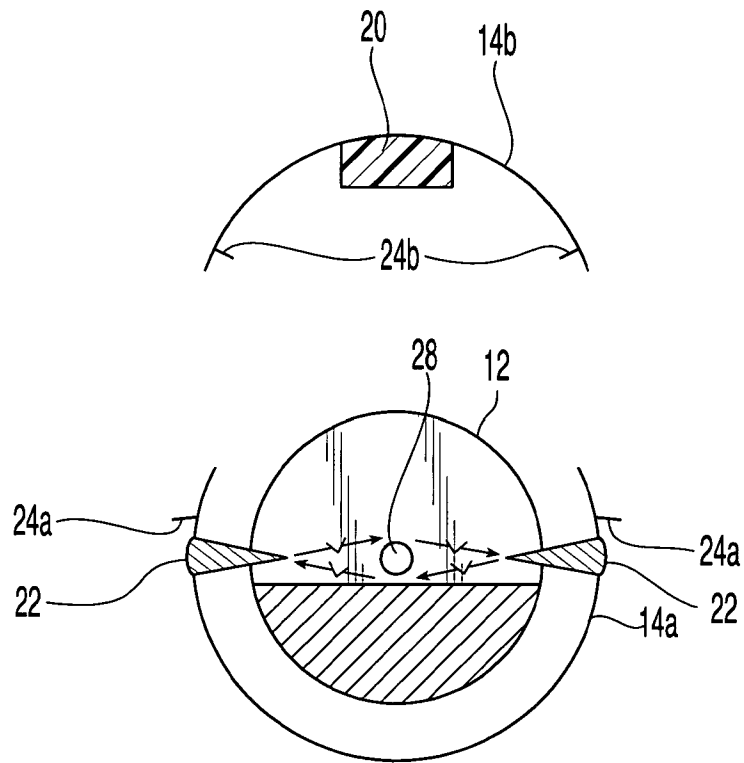


Fig. 2

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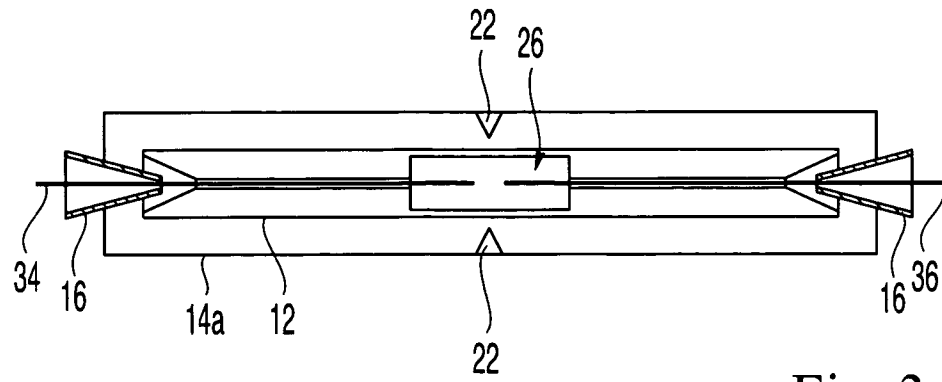


Fig. 3a

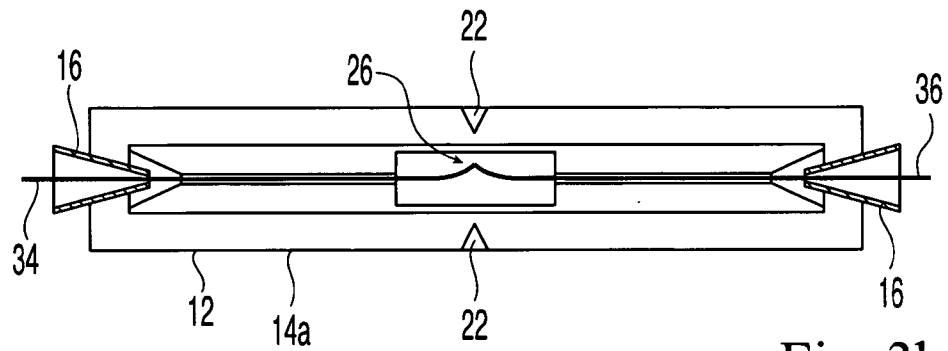


Fig. 3b

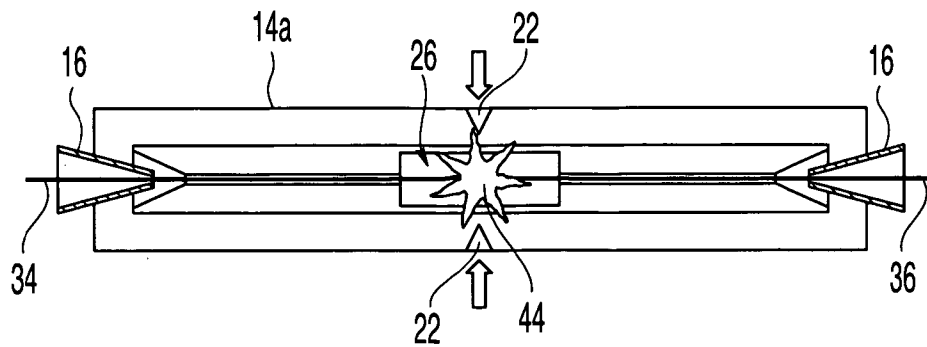


Fig. 3c

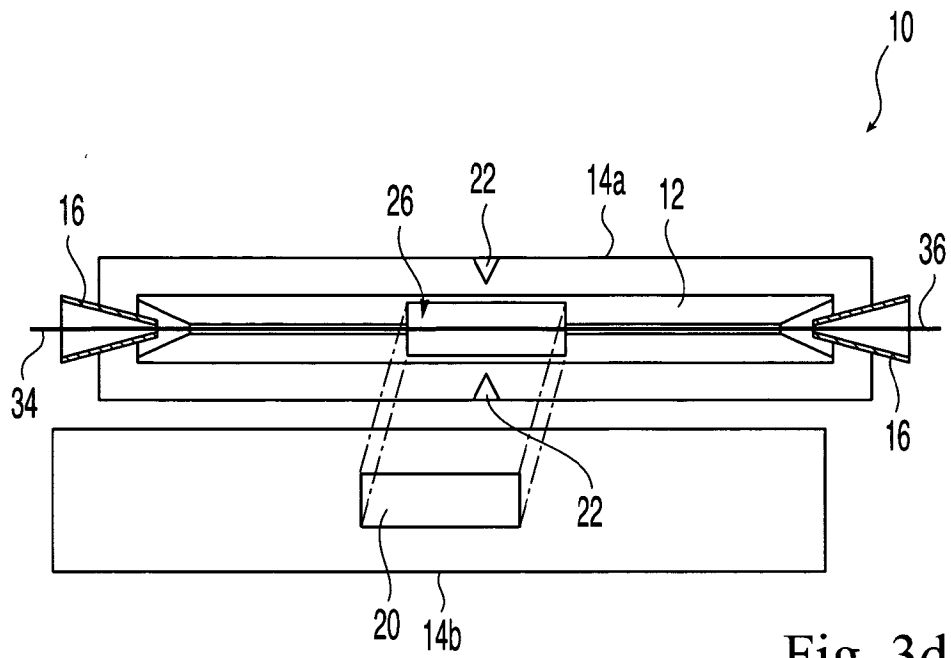


Fig. 3d

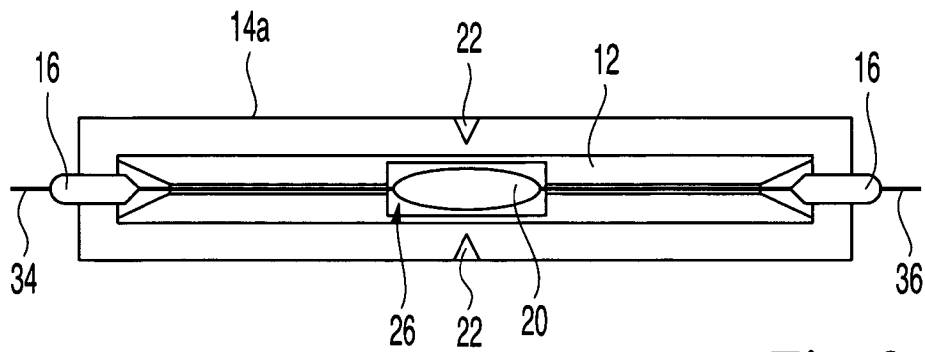


Fig. 3e

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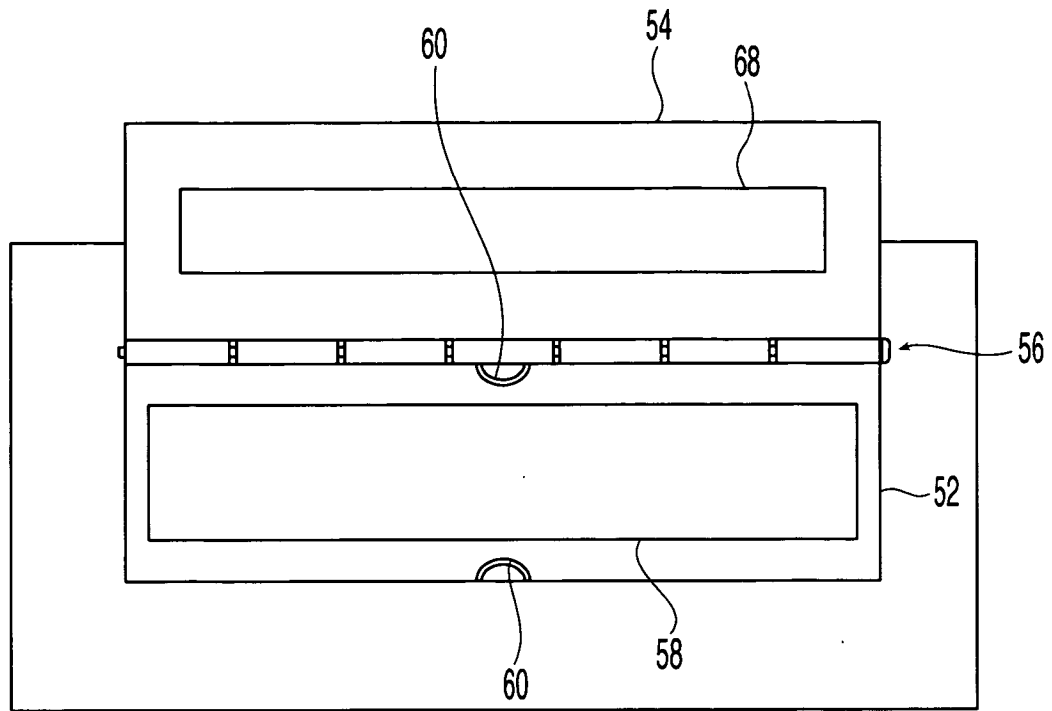


Fig. 4

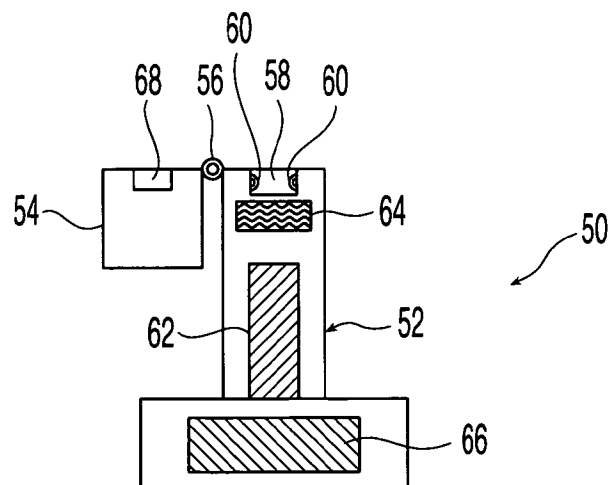


Fig. 5

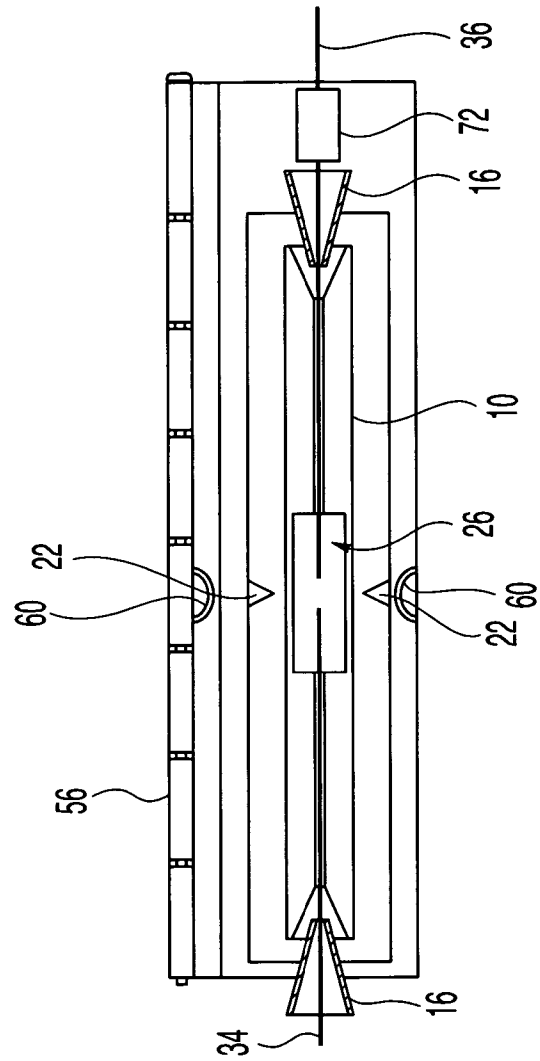


Fig. 6

DECLARATION AND POWER OF ATTORNEY

As below named inventors we hereby declare that: Our residence, post office address and citizenship is as stated below next to our names.

We believe we are the original, first, and joint inventors of the subject matter which is claimed and for which a patent is sought on the invention, entitled:

FIBER OPTIC SPLICE COMPONENT

of which:

Check One

- ☒ is attached hereto.
☐ was filed on _____, (if applicable)

We hereby state that we have reviewed and understand the contents of the above-identified specification, including the claims as amended by any amendment referred to above.

We acknowledge the duty to disclose information which is material to the examination of this application in accordance with *Title 37, Code of Federal Regulations*, Section 1.56(a).

We hereby claim foreign priority benefits under *Title 35, United States Code*, 119(a)-(d) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Applications: None

N/A	N/A	N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No
Number	Country	Day/Month/Year Filed	Priority Claimed
N/A	N/A	N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No
Number	Country	Day/Month/Year Filed	Priority Claimed

We hereby claim the benefit under *Title 35, United States Code*, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of *Title 35, United States Code*, Section 112, we acknowledge the duty to disclose material information as defined by *Title 37, Code of Federal Regulations*, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

<i>Application Serial No.</i>	<i>Filing Date</i>	<i>Status: Patented/Pending/Abandoned</i>
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We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of *Title 18 of the United States Code* and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.


POWER OF ATTORNEY

As named inventors, we hereby appoint Timothy J. Aberle (Registration Number 36,383), Michael E. Carroll, Jr. (Registration Number 46,602), and Christopher C. Dremann (Registration Number 36,504) our attorneys with full powers (including the powers of appointment, substitution, and revocation) to prosecute this application and any division, continuation, continuation-in-part, reexamination, or reissue thereof, and to transact all business in the Patent and Trademark Office connected therewith; the mailing address and the telephone number of the correspondence attorney is:

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